Listing of Claims:

Claim 1 (Original): A method of fabricating a polysilicon film by an excimer laser crystallization process, the method comprising following steps:

providing a substrate defined with a first region and a second region;

forming an amorphous silicon film on the substrate;

forming a mask layer on the amorphous silicon film;

performing a first photo-etching process to remove the mask layer in the first region;

forming a heat-retaining capping layer covering the mask layer and the amorphous silicon film; and

performing the excimer laser crystallization process to make the amorphous silicon film in the first region crystallize to a polysilicon film.

Claim 2 (Original): The method of claim 1 wherein the substrate comprises a buffer layer and the amorphous film is formed on the buffer layer.

Claim 3 (Original): The method of claim 2 wherein the method further comprises a second photo-etching process to remove the heat-retaining capping layer, the mask layer, and the amorphous silicon film on the buffer layer in the second region after forming the polysilicon film.

Claim 4 (Original): The method of claim 1 wherein the method further comprises an etching process to remove the heat-retaining capping layer after forming the polysilicon film.

Claim 5 (Original): The method of claim 1 wherein the mask layer comprises a silicon oxide layer, a silicon nitride layer, a metal layer, or a silicon-oxy nitride layer.

Claim 6 (Original): The method of claim 1 wherein the mask layer is a multi-layer structure.

Claim 7 (Original): The method of claim 1 wherein the heat-retaining capping layer comprises a silicon oxide layer, a silicon nitride layer, a metal layer, or a silicon-oxy nitride.

Claim 8 (previously presented): The method of claim 1 wherein the excimer layer crystallization process uses an excimer laser to irradiate the amorphous film to make the amorphous silicon film in the second region, which is covered with the mask layer, become partially melted and make the amorphous film in the first region, which is not covered with the mask layer, become completely melted, and grains are grown laterally toward the first region from the interface between the first region and the second region so as to form a polysilicon film in the first region.

Claim 9 (Original): The method of claim 8 wherein the heat-retaining capping layer is used to decrease the heat dissipating rate of the amorphous silicon film for increasing the size of the grains formed in the excimer laser crystallization process.

Claim 10 (Original): The method of claim 1 wherein the excimer laser crystallization process is performed with an excimer laser comprising a long duration laser.

Claim 11 (Original): The method of claim 10 wherein the long duration laser has a period in a range of about 150 to 250 ns.

Claim 12 (Original): A method of fabricating a polysilicon film by an excimer laser crystallization process, the method comprising following steps:

providing a substrate defined with a first region and a second region;

forming an amorphous silicon film on the substrate;

forming a heat-retaining capping layer on the amorphous silicon film;

forming a mask layer on the heat-retaining capping layer;

performing a first photo-etching process to remove the mask layer in the first region; and

performing the excimer laser crystallization process to make the amorphous silicon film in the first region crystallize to a polysilicon film.

Claim 13 (Original): The method of claim 12 wherein the substrate comprises a buffer layer and the amorphous silicon film is formed on the buffer layer.

Claim 14 (Original): The method of claim 13 wherein the method further comprises a second photo-etching process after forming the polysilicon film to remove the heat-retaining capping layer, the mask layer, and the amorphous silicon layer on the buffer layer.

Claim 15 (Original): The method of claim 12 wherein the method further comprises an etching process to remove the heat-retaining capping layer.

Claim 16 (Original): The method of claim 12 wherein the mask layer comprises a silicon oxide layer, a silicon nitride layer, a metal layer, or a

silicon-oxy-nitride layer.

Claim 17 (Original): The method of claim 12 wherein the mask layer is a multi-layer structure.

Claim 18 (Original): The method of claim 12 wherein the heat-retaining capping layer comprises a silicon oxide layer, a silicon nitride layer, or a silicon-oxy nitride layer.

Claim 19 (previously presented): The method of claim 12 wherein the excimer layer crystallization process uses an excimer laser to irradiate the amorphous film to make the amorphous silicon film in the second region, which is covered with the mask layer, become partially melted and make the amorphous film in the first region, which is not covered with the mask layer, become completely melted, and grains are grown laterally toward the first region from the interface between the first region and the second region so as to form a polysilicon film in the first region.

Claim 20 (Original): The method of claim 19 wherein the heat-retaining capping layer is used to decrease the heat dissipating rate of the amorphous silicon film for increasing the size of the grains formed in the excimer laser crystallization process.

Claim 21 (Original): The method of claim 12 wherein the excimer laser crystallization process is performed with an excimer laser comprising a long duration laser.

Claim 22 (Original): The method of claim 21 wherein the long duration laser has a period in a range of about 150 to 250 ns.